Before the
FEDERAL COMMUNICATIONS COMMISSION
Washington, D.C. 20554

In the Matter of	)	
	)	
Advanced Television Systems and Their Impact on the Existing Broadcast Service	)	MM Docket No. 87-268
	)	
Review of Technical and Operational Requirements: Part 73-E, Television Broadcast Stations	)	
	)	
Reevaluation of the UHF Television Channel and Distance Separation Requirements of Part 73 of the Commission's Rules	)	
	)	

REPLY COMMENTS OF MST

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SERVICE TELECASTERS

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January 19, 1988

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SUMMARY

The initial comments filed in response to the Commission's Notice of Inquiry on Advanced Television Systems demonstrate that, despite the diversity of interests concerned with the development and implementation of advanced television systems ("ATV"), there is a broad consensus on three points:

First, the emergence of ATV systems represents an extremely important development which will redefine the standard of quality in video delivery services and could have an enormous impact on the relative competitiveness of those services.

Second, developing standards for and implementing ATV requires exploring a host of complex of interrelated issues regarding, inter alia, the performance of ATV systems, their compatibility with existing receivers, the robustness of ATV signals in broadcast, cable and satellite transmissions, and the cost of advanced receivers.

Third, while it is crucial that these issues be resolved in the near future, definitive decisions, including decisions on channel size, cannot be based on the information currently available to the Commission. Further development, testing and evaluation must be completed before the Commission responsibly can answer the questions raised in the Notice of Inquiry.

The comments also demonstrate that an industry effort to resolve these issues is already underway. Equipment manufacturers, system developers, cable interests,

satellite systems and local broadcasters alike have emphasized the importance of this effort and the need for the Commission to await the results of the system development and evaluation efforts which are now being pursued so that ATV service can be implemented in a way that best that will best ensure the participation of all media.

It is particularly important that local broadcasters have the ability to participate in the advancements offered by ATV. As the comments highlight, local broadcasters alone provide the free, local, universal service that has played a "key role" in the regulation of the mass media in this country. Accordingly, the Commission should not make any premature decisions that might prejudice the ability of broadcasters to offer ATV until broadcast ATV systems have be thoroughly tested and comparatively evaluated.

As the process of developing and evaluating ATV systems moves forward, the Commission should continue to take specific actions to facilitate and expedite a thorough and adequate inquiry. It should disavow actions suggested by some commenters that would foreclose or prejudge certain options for the implementation of ATV that are now being investigated, such as limiting spectrum requirements to 6 MHz or acting now to adopt the MUSE system as the ATV system for the United States. Instead, the Commission should establish dates for further comment as the results of new developments become available and initiate studies to facilitate the smoothest possible transition to ATV service.

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REPLY COMMENTS OF MST

The Association of Maximum Service Telecasters ("MST") hereby submits its Reply Comments in response to the the Commission's Notice of Inquiry on Advanced Television Systems, 2 FCC Rcd. 5125 (1987) ("NOI").

The initial comments demonstrate that despite the diversity of interests concerned with the development and implementation of advanced television systems ("ATV"), there is a broad consensus on three points.

First, the emergence of ATV systems represents an extremely important development which will redefine the standard of quality in video delivery services and could have an enormous impact on the relative competitiveness of those services.

Second, developing standards for and implementing ATV requires exploring a host of complex, interrelated issues regarding, inter alia, the performance of ATV systems, their compatibility with existing receivers, the robustness of ATV signals in broadcast, cable and satellite transmissions and the cost of advanced receivers.

Third, while it is crucial that these issues be resolved in the near future, definitive decisions, including decisions as to channel size, cannot be based on the information currently available to the Commission. Further development, testing and evaluation must be completed before the Commission responsibly can answer the questions raised in the NOI.

As stated in the "Joint Reply Comments and Request for Setting Additional Comment Dates," filed today on behalf of MST, the National Association of Broadcasters ("NAB") and the National Cable Television Association ("NCTA"), MST believes that this initial round of comments has provided a great deal of useful information. But the comments also highlight the need for the Commission to continue the current inquiry and facilitate the developmental and evaluation efforts necessary to answer the questions raised in the NOI. The importance of ATV to American broadcasting, and more particularly, the importance of remitting local broadcasters to deliver ATV service to the public, requires that the Commission not take any actions that would

prematurely foreclose the options currently under investigation.

In addition, the comments demonstrate that a vigorous industry effort to resolve the issues raised in the Commission's comprehensive NOI is already underway. This effort is driven by the realization that prompt resolution of ATV spectrum and technical issues is essential for broadcasting (and other media) to remain competitive. Regardless of whether it is characterized as a threat or a challenge, it is clear that the emergence of ATV in the marketplace is imminent. High definition television ("HDTV") will soon be available by VCR and perhaps by satellite. Cable systems and terrestrial broadcasters must undertake the research and expense necessary to deliver this level of quality or accept the prospect of becoming second class services.[1/] Consequently, the industry has already committed to a massive effort to resolve these issues as expeditiously as possible in order to preserve its ability to provide the highest quality service to the public.[2/]

1/ Comments of New York Institute of Technology, at 23-24; The Japan Broadcasting Company believes that receivers capable of displaying the MUSE HDTV system will be in full production by 1992. Comments of NHK - The Japan Broadcasting Company, at 10-11.

2/ Comments of NAB, 7-8.

As this effort moves forward, the Commission should continue to act to facilitate the exchange of information regarding ATV developments through this NOI, and disavow any actions that would prejudice the implementation of ATV in the near future.

I. THE COMMENTS DEMONSTRATE THAT THERE IS BROAD AGREEMENT ON THE SIGNIFICANCE OF ATV, THE IMPORTANCE OF ASSURING THAT LOCAL BROADCASTERS ARE ABLE TO PARTICIPATE IN THESE DEVELOPMENTS, AND THE NEED FOR THE COMMISSION TO THOROUGHLY EVALUATE THE ISSUES AS PART OF AN OVERALL EVALUATION PROCESS BEFORE SETTING STANDARDS OR SPECTRUM REQUIREMENTS.

All of the commenters familiar with the potential of ATV systems echo the conviction that ATV -- in particular HDTV -- represents a significant quantitative leap in video quality. Japanese broadcasting authorities are clearly convinced that HDTV will displace NTSC as the standard of quality in the video marketplace and media that do not or cannot offer this service will suffer substantial audience loss.[3/] System developers and broadcasters in this country are equally convinced that high quality service is important to the public and that public demand for high quality video will drive broadcasters in this country to implement this service.[4/] The experience with compact discs, large screen

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3/ Comments of NHK - The Japan Broadcasting Company, at iii-iv.

4/ Comments of CBS, at 49-50; Comments of North American Philips, at 7-13; Comments of NAB, at 18, App. D; see also Comments of NCTA, at 8-9.

televisions and other advanced consumer electronics should leave "no doubt that consumer demand exists for a system vastly superior to NTSC."[5/] The existing NTSC service may well suffer the fate of AM radio and black-and-white television.[6/]

Ensuring that local broadcasters have the ability to participate in these advancements is particularly important. Fostering the provision of local programming by local stations has played a "key role" in the regulation of the mass media in this country that cannot be ignored.[7/] No other media fulfills the "public interest" in this local programming.[8/] Moreover, universal access to ATV may well depend on Commission action to permit local broadcasters to offer this service.[9/] The inability of local broadcasters to deliver ATV would not only injure competition, but might well mean the slow erosion of the unique system of local, universal service offered by public and commercial

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5/ Comments of NHK - The Japan Broadcasting Company, at 5.

6/ Japan Satellite Broadcasting, Inc., at 2; NHK - The Japanese Broadcasting Company, at 9-10, 23; Comments of Matsushita Electronic Corporation and Matsushita Electric Industrial Group Companies, at 18.

7/ Comments of the National Telecommunications Administration, at 5-8.

8/ Comments of Dr. William Schrieber, at 2-4.

9/ Comments of the National Telecommunications and Information Administration, at 5.

broadcasters.[10/] No other competing use of spectrum presents the same, compelling public interest considerations.[11/]

The vast majority of comments also agree that there is at present insufficient information to resolve the issues raised in the NOI regarding standards and the implementation of ATV service. The myriad of criteria and considerations offered for evaluating various ATV systems in the comments only highlight the number of interrelated questions which must be explored before standards can be considered: the subjective and objective quality of the systems; the compatibility of various systems with existing receivers, cable plants, video encryption and satellite distribution systems; the interference and ghosting characteristics of ATV signals over various transmission paths; the cost of ATV systems to consumers; and the spectrum required to implement ATV.

The importance and complexity of implementing ATV service in a manner that will best ensure the participation of all media require that the Commission not attempt to decide these issues until they have been thoroughly

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10/ Comments of the Corporation for Public Broadcasting and Public Broadcasting Service, at 5-8; Comments of the Association of Independent Television Stations, at 3-4; Comments of American Family Broadcast Group, at 9.

11/ Comments of CBS, at 50-55.

evaluated. Equipment manufacturers, system developers, cable interests, satellite systems and local broadcasters alike emphasize the necessity of awaiting further system development and evaluation to address these questions.[12/] ATV standards, including spectrum requirements, must "be derived only after thorough and objective evaluation and testing of all state-of-the-art technology and the available technical alternatives," and must also "be flexible enough to accommodate improvements generated by advancing technology in the future."[13/]

The comments also make clear that the issue of spectrum requirements for terrestrial broadcast ATV cannot be artificially separated and resolved in advance of this overall evaluation process. Receiver manufacturers and system developers stress that system performance, protection criteria, susceptibility to taboos, modulation techniques and cost are all related to the channel-width and spectrum allocation considerations for ATV systems.[14/] Evaluation of

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12/ Comments of North American Philips, at 21; Comments of NCTA, at 14; Comments of ATSC; Comments of General Instrument Corporation at 4; Comments of NAB, at 9-12; Comments of Corporation for Public Broadcasting, at 16-19.

13/ Comments of Zenith Electronics Corporation, at 3.

14/ Comments of David Sarnoff Laboratories, at 3-14; Comments of North American Philips at 29-30; Comments of Zenith Electronics Corporation, at 3, 10; NHK - The Japanese Broadcasting Company, at 20-21; Comments of Matsushita

(Footnote Continued)

spectrum requirements will require field testing of the candidate systems over-the-air and on cable, determining the necessary protection criteria, making subjective and objective comparisons of the performance of the systems, and considering the need for additional spectrum to provide even further improvement to these advanced systems.[15] These issues cannot be resolved in the timetable that has been set by the Commission for the Advisory Committee's first report on spectrum requirements, and must await resolution of the industry's efforts to develop standards for the transmission of ATV.[16]

II. AS THIS PROCESS OF EVALUATION GOES FORWARD, THE COMMISSION SHOULD TAKE ACTION TO FACILITATE AND EXPEDITE A THOROUGH AND ADEQUATE INQUIRY, INCLUDING DISAVOWAL OF ACTIONS THAT WOULD FORECLOSE OR PREJUDGE IMPORTANT OPTIONS.

A few of the commenters have suggested that the Commission take specific actions at this time. It is obvious that some of these actions should not be taken because they would prematurely foreclose or severely prejudice important options for the implementation of ATV

(Footnote Continued)

Electronic Corporation and Matsushita Electric Industrial Group Companies, at 13-14; Comments of General Electric Consumer Electronics, at 12.

15/ Comments of NBC, at 11-14; Comments of Corporation for Public Broadcasting and Public Broadcasting Corporation, at 16-19; Comments of NCTA, at 14.

16/ Comments of National Telecommunications Administration, at 7; Comments of Cox Enterprises, at 2.

that are currently being actively explored. On the other hand, the Commission should continue to take actions which, like the creation of the blue-ribbon Advisory Committee, will facilitate and expedite efforts to develop standards and permit the smoothest possible transition to ATV service.

A. Actions That The Commission Should Not Take

1. The Commission Should Not Restrict ATV Spectrum Requirements to 6 MHz

The Land Mobile Communications Council ("LMCC") urges the Commission to restrict spectrum for broadcast ATV to 6 MHz. As MST has noted in the past and the comments before the Commission demonstrate, such a restriction might foreclose any possibility of implementing a competitive-quality ATV system that will also protect consumers' investment in existing receivers.

LMCC is quite correct in noting that if a 6 MHz, receiver-compatible ATV system of adequate quality can be developed it will offer the greatest overall benefits to the public because it would protect service to the 196 million existing receivers, a factor which the Commission has already recognized is entitled to great weight.[17/] NOI, at ¶ 83. Such as system would also offer the least disruptive

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17/ Comments of LMCC, at 9. The 196 million estimate is taken from the FCC's Report, "The FCC and the American Economy," at 7 (June 1986) (citing 1986 Television Factbook).

means for broadcasters to implement ATV and would be quickly embraced if it proved feasible and was able to deliver adequate quality.

Virtually every informed assessment of present technology, however, concludes that it will not be possible to develop such a system in the foreseeable future, if ever. Almost all of the leading organizations involved in ATV research have indicated that 6 MHz is insufficient to deliver a compatible, high-quality ATV system.[18] These conclusions are reinforced by ATSC's analysis of the difficulties of compressing broadband HDTV into a 6 MHz channel, and the conclusion of various equipment manufacturers that such a system is unlikely to emerge.[19]

18/ Comments of NHK - The Japanese Broadcasting Company, at 19; Comments of Toshiba; Comments of Matsushita Electronic Corporation and Matsushita Electric Industrial Group Companies, at 6; Comments of the New York Institute of Technology, at 10; Comments of the Broadcasting Technology Association; Comments of North American Philips, at 5, 27-28; Comments of Dr. William Schrieber; Comments of David Sarnoff Laboratories, at 3-4. The Del Rey Group has been working on technology to develop such a system. Although computer simulations have produced promising results, further development is necessary before it can be determined whether this technology will offer a feasible system.

The only other comments indicating a belief that such a system is possible are those of Radio Telecommunications & Technology, which do not disclose any basis for its belief, or describe any system or technology that would achieve this spectrum efficiency.

19/ Comments of ATSC, Exhibit 5; Comments of GE Consumer Electronics, at 12; Comments of Zenith Electronics, at 10.

Nor do the NBC/RCA/Sarnoff Laboratories "ACTV" system or the NHK MUSE "ADTV" systems, cited by LMCC, offer a basis for the Commission to conclude that 6 MHz will be adequate for compatible, high-quality ATV. Both systems have yet to be demonstrated in prototype hardware or field tested. Moreover, the proponents of these systems themselves are emphatic that these systems alone will not provide sufficient quality for broadcasters to remain competitive over the long term and additional spectrum will be necessary.[20/] Moreover, there is every indication that systems such as these, which attempt to compress more information and deliver a higher quality picture than NTSC service, will be significantly more susceptible to interference.[21/] Even if one were to assume that these systems will prove to be feasible and assume that they will provide sufficient quality to remain competitive over the long term without the need for additional spectrum, alternative uses of the broadcast spectrum, e.g., for land mobile radio, could not be considered until the interference and propagation characteristics of these systems were thoroughly evaluated.

20/ Comments of NHK - The Japan Broadcasting Company, at 11-17; Comments of David Sarnoff Laboratories, at 3, 8; Comments of NBC, at 11-12.

21/ Comments of NBC, at 14; Comments of David Sarnoff Laboratories, at 17.

The comments also belie LMCC's assertion that "it is far from certain that sufficient UHF spectrum exists to accommodate existing VHF and UHF stations with an auxiliary half channel." Comments of LMCC, at 12. As the preliminary spectrum study previously submitted by MST (and appended to its comments in this proceeding) demonstrates, given certain assumptions, even in the most congested television markets there appears to be sufficient spectrum to accommodate all existing stations with a 3 MHz augmentation channel.22/ North American Phillips has discussed how innovative modulation techniques may make it possible to provide all, or virtually all, existing stations with 6 MHz augmentation channels.23/

Finally, there is at least substantial doubt about the alleged need to move forward with the proposals in the UHF Sharing proceeding. As MST's previous comments have discussed, the record before the Commission indicates that the interference-protection criteria proposed in that Docket are inadequate to ensure the minimal impact from sharing that the Commission intended. Moreover, the Commission's

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22/ See Initial Comments of MST, Appendix B. LMCC's attempts to challenge the results of this study have been more than adequately answered by MST's prior comments, and, it appears, the Commission's own studies of spectrum availability. See Gen. Docket 85-172, Further Reply Comments of MST, at 23; NOI, at ¶ 57.

23/ Comments of North American Phillips, at 38-41.

own studies on land mobile spectrum utilization indicate that the existing land mobile spectrum is heavily underutilized. At best, the record indicates that there may be no need for additional land mobile spectrum. But even under pessimistic assumptions, the evidence on spectrum utilization indicates that there is no urgent need to go forward with the proposals for UHF sharing before the important issues raised in this NOI are thoroughly evaluated and resolved. See Gen. Docket No. 85-172, Comments of MST on Commission Documents (June 10, 1987); Further Reply Comments of MST (July 31, 1987).

2. The Commission Should Not Adopt The MUSE System As The ATV System For The United States

NHK has advocated that the Commission adopt the MUSE system and the "MUSE Family" of systems as the ATV system for the United States. Although the MUSE system represents a tremendous technical achievement, it is evident from the comments that a decision to adopt the MUSE system would be inappropriate at this time.

The MUSE system, designed with the needs of Japan in mind, may not be the best system for American broadcasting. First, it is apparent that implementing the 9 MHz, receiver-incompatible MUSE system would present the Commission and the broadcasting industry with the two undesirable (and possibly impractical) alternatives: (1) repacking VHF and UHF broadcast spectrum to provide 9 MHz

channels, thereby rendering the $80 billion consumer investment in receivers obsolete overnight and uprooting the allocations system that has developed over the past 50 years; or (2) attempting to use the 12 GHz or other microwave band for terrestrial broadcasting, which will require multiple transmitters and special home antennas leading many experts to the conclusion that this option is wholly impractical, if not impossible.[24/] Moreover, the comments indicate that MUSE technology may not be ideally suited for the American cable or satellite industry.[25/]

Although it is important that MUSE be considered as an option for implementing ATV, the overall evaluation of ATV systems may indicate that systems which are being designed and developed with the needs of American broadcasting in mind may prove to be equal, or superior, in quality, and will not have the implementation problems presented by MUSE. It is simply too early to determine

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24/ See, e.g., Comments of New York Institute of Technology, at 18. Test of the propagation characteristics of these bands which are expected to be completed during the coming year will provide more definitive information on the feasibility of using this spectrum for ATV.

25/ See, e.g., Comments of Time, Inc. at 31; Comments of General Instrument Corporation, 31.

whether the NHK system, or any other specific ATV system, will be an appropriate choice for ATV transmission.[26/]

3. The Commission Should Not Relax The NTSC Standard.

Several commenters supported the suggestion in the NOI that it may be appropriate to relax the NTSC standard as a means of promoting implementation and experimentation with ATV technologies. As noted in the initial comments of MST and others, however, it is too early to consider such action. The NTSC standard is likely to retain its vitality for some time and many of the proposed systems are specifically designed to exploit and build upon the efficiency of the present NTSC system.[27/] Relaxation of the standard is not necessary to promote or permit ATV developmental efforts at this time, and, indeed, no ATV system proponent has suggested that the Commission take such action. On the other hand, relaxing the standard might create confusion and permit serious degradation of existing service.[28/] No changes in the existing standard should be

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26/ Comments of the Motion Picture Association of America, at 6.

27/ See, e.g., Comments of North American Phillips Corporation, at 14-18; Comments of New York Institute of Technology.

28/ See Comments of NAB, at 19; Comments of GE Consumer Electronics, at 14-15; Comments of Corporation for Public Broadcasting and Public Broadcasting Corporation, at 13.

considered until more is known regarding the standards which will be necessary for ATV.[29]

4. The Commission Should Not Permit The Flexible Use Of Augmentation Spectrum Or Negotiation of Interference Rights.

There appears to be virtually universal acclamation that the suggestions in the NOI regarding plans for flexible use of augmentation spectrum and negotiation of interference rights would not, as a general matter, be in the public interest. The numerous problems with such schemes -- as a matter of the Commission's legal authority, as a matter of sound policy, and as a matter of practical implementation -- are extensively detailed in the comments.[30] Perhaps most telling is the observation of Matsushita that a general policy of permitting discretionary use of additional spectrum could only be viewed as the adoption of a goal of promoting the gradual demise of local

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29/ This includes alteration of the standards for LPTV and translator stations to permit experimentation, as advocated by Cosmopolitan Broadcasting Corporation. See Comments of Cosmopolitan Broadcasting. Moreover, there should be no change in the rules to permit other types of advanced services without examining the merits and possible interference effects of the proposed service, and its possible impact on ATV. See Comments of Radio Telecommunications and Technology (advocating general relaxation of rules to permit non-ATV advanced systems).

30/ See, e.g., Comments of David Sarnoff Laboratories, at 29-30; Comments of Zenith Electronics Corporation at 20-21; Comments of Dr. William Schrieber, at 2-5.

broadcast service in favor of other, less public, delivery systems.31/

B. Specific Actions That The Commission Should Take.

1. The Commission Should Initiate A Study Of Ways to Improve Receiver Immunity To UHF Taboos.

Several parties have suggested that the Commission initiate a study, perhaps by way of separate proceeding, into the development of receivers that will have better immunity to UHF taboos, in order to help provide the additional broadcast spectrum which may be necessary for ATV service.32/ MST believes that such an initiative would be appropriate at this time and may be most expeditiously accomplished through a separate proceeding.

The comments clearly indicated that the relaxation UHF taboos should not be relaxed as suggested in the NOI. In addition to MST's discussion of the inappropriateness of the "VHF-Reference" concept as a means of analyzing taboo susceptibility, the Electronic Industries Association, Zenith Electronics and others, pointed out the numerous flaws in using this type of study to evaluate taboo

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31/ Comments of Matsushita Electronic Corporation and Matsushita Electric Industrial Group Companies, at 18.

32/ See, e.g., Comments of the National Telecommunications and Information Agency, at 8; Comments of David Sarnoff Laboratories, at 26.

protection.[33/] The commenters universally agreed that the only taboo for which relaxation of the protection standards might be appropriate is the oscillator taboo. Since relaxation of this taboo is based on the reduction of receiver radiation which currently is being considered in another Docket, it should not be considered until the radiation standards to be adopted in that docket are resolved. See Initial Comments of MST at 52-53.

Nonetheless, the comments indicated that technological improvements to increase receiver immunity to taboos were possible but must be thoroughly studied to consider the cost, the degree to which they will prove effective, and the period of time it will take to implement such improvements.[34/]

As the Commission observed in the NOI, the most promising source of additional spectrum for the implementation of ATV is the existing VHF and UHF television spectrum. NOI, at ¶ 55. Providing sufficient spectrum for existing stations to deliver ATV through the use of augmentation spectrum may well require relaxation of the UHF

33/ See Comments of the Consumer Electronics Group of EIA, at 3-10; GE Consumer Electronics, at 17-18; Comments of Zenith Electronics Corporation at 13-16; Comments of David Sarnoff Laboratories, at 22.

34/ See, e.g. Comments of David Sarnoff Laboratories, at 21-25; Comments of GE Consumer Electronics, at 16, 17, 20-22.

taboos. But in order to relax the taboos, an overwhelming number of receivers in service must have improved immunity to taboo interference. Efforts to take the steps necessary to increase the immunity of receivers being sold must begin well in advance so that improved receivers can gradually displace the existing receiver population and provide a basis for relaxing the taboos.

As indicated by the comments the objective of this initiative should be to provide additional spectrum for implementing ATV service. The spectrum which is made available through the reduction of taboos is unlikely to provide meaningful opportunities for new allocations, but may afford an opportunity for ATV augmentation channels for systems that use modulations schemes that are designed to minimize interference.35/ Indeed, any decision on relaxing the taboos must await information on the interference characteristics of ATV systems based on the performance of existing, improved, and ATV receivers.36/

35/ See Comments of the Consumer Electronics Group of EIA, at 13; see also Comments of NBC, at 18; Comments of David Sarnoff Laboratories, at 28.

36/ Comments of NBC, at 18.

2. The Commission Should Facilitate Further Opportunities For Comment And Exchange of Information On ATV Developments.

The Commission's NOI has already provided a great deal of useful information on the complex issues involved in the implementation of ATV and the efforts that are underway to resolve those issues. The Commission's Advisory Committee will provide another useful vehicle for the exchange of information on these efforts. The Commission should continue to facilitate these developmental and research efforts by indicating that it remains open to all feasible options for the implementation of ATV and by establishing further dates for comment in this proceeding as the results of these developments become available for comment. See Joint Reply Comments and Request For Additional Comment Dates.

Respectfully submitted,

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